THE GROUSE AND ITS AILMENTS.

The Grouse in Health and in Disease: being the Final Report of the Committee of Inquiry on Grouse Disease. Two vols. Vol. i., pp. xxiii+512. Vol. ii., appendices, pp. vii+140+11 plates (41 maps). (London: Smith, Elder, and Co., 1911.) Price *2l. 2s.* net.

ALTHOUGH, as its name implies, the Grouse Disease Inquiry Committee was formed to investigate the nature and causes of the mortality which has been so prevalent of late years in the one species of game bird peculiar to the British Isles, it has accomplished a great deal more than this. For in the handsome volumes before us we have the life-history and organisation of the grouse, coupled with those of the various parasites by which it is infested, described in a manner never before attempted in the case of any other wild bird. This magnificent piece of work, it should be added, has been carried out from start to finish by private effort and enterprise; for although the committee was officially appointed by the Board of Agriculture and Fisheries in the spring of 1905, its funds have been entirely furnished by private subscriptions. The whole investigation is, indeed, a striking, and we believe, a unique example of what can be done by the combined efforts of sportsmen, gamekeepers, field-observers, and biological experts; and to Lord Lovat, the chairman, and all those who have worked with him are due the gratitude of naturalists and sportsmen, not only in the British Islands, but throughout the world.

The first volume opens with an introduction by Lord Lovat, in which are recorded the formation of the committee, the scope of the inquiry, and a general summary of the results of the investigation. Then follow six chapters by various experts dealing with the natural history of the grouse in its normal condition, among which special reference may be made to Mr. E. A. Wilson's elaborate and careful account of the changes of the plumage, both in health and in disease. Since, however, much of this has already appeared in the Zoological Society's Proceedings, it will be familiar to many of our readers. Part ii., containing ten chapters, is devoted to the diseases of the grouse; while the third part, with the remaining seven chapters, treats of the management and economic aspects of grouse-moors. The second volume, containing only 150 pages, is devoted to lists of the names of the committee, correspondents, and subscribers, together with a number of statistical tables.

Since various notices of the progress of the inquiry have appeared from time to time in NATURE, the present review must be short. It will accordingly suffice to mention that grouse suffer chiefly from two diseases, namely, strongylosis, due to a thread-worm, *Trichostrongylus pergracilis,* and the so-called coccidiosis, caused by the sporozoon now known as *Eimeria avium.* The former attacks adult birds, and may accordingly be regarded as the chief cause of the great epidemics of "grouse disease" which have in past years wrought such destruction. The latter, on the other hand, as has been recently mentioned in our "Notes" columns, in connection with a paper by Dr. Fantham on coccidiosis in poultry, confines its attacks to young birds, which are either killed outright or recover; this disease, which was discovered during the investigation, can, therefore, have little or nothing to do with the great epidemics among adult birds. In the report the parasite of coccidiosis is referred to as *Eimeria* (*Coccidium*) *avium.* This, we may point out, is misleading, since to the systematist it would indicate that Coccidium is a subgenus of Eimeria, whereas it is really a synonym of the latter which has been discarded on grounds of priority. If this rejection be definitely accepted, we may suggest that it would be advisable to rename the disease eimeriosis, since it is obvious that if there be no such genus as Coccidium the retention of the name coccidiosis is illogical. There would, moreover, be the further advantage that we should have but one name to remember in place of two. For a somewhat similar reason, Dr. Shipley suggests on p. 207 of the first volume that strongylosis should be renamed trichostrongylosis, although there is the genus Strongylus.

The account of the life-history of the thread-worm of the grouse is written by Dr. R. T. Leiper; Dr. Shipley communicating a general account of the group (Nematoda) to which it belongs. The sporozoon (Eimeria) is discussed by Dr. Fantham, whose article appeared previously in the Proceedings of the Zoological Society. As mentioned in the "Notes" columns of NATURE some time ago, this intestinal parasite especially affects the duodenum and cæca (unusually long in the grouse), and has two developmental phases, namely, an asexual schizogony, and a sexual form in which cysts and spores, suited to a life outside the host, are produced.

Of less importance, from the point of view of the sportsman, are the tapeworms of the grouse, which are described by Dr. Shipley. Although the birds are attacked by three species of these organisms, two only need be mentioned here, namely, the large *Davainea urogalli* and the small *Hymenolepis microps,* of which the latter is by far the more dangerous to the life of its victims.

As regards future prospects, the great hope appears to lie in the proper method of managing the moors. "To put it briefly and in practical language," writes Lord Lovat, "moor-management is the science of distributing the stock of birds over the moor, so that at no period of the year can any area be so infested by the strongyle worm as to make it a source of danger to the least well-nourished bird in that area."

R. L.

CLIMATIC CHANGE.

Palestine and its Transformation. By Prof. E. Huntington. Pp. xvii+443. (London: Constable and Co., Ltd.; Boston and New York: Houghton, Mifflin and Co., 1911.) Price *8s. 6d.* net.

SEVERAL years of travel in Asia Minor, Persia, India, and central Asia, and a prolonged study of the arid and semi-arid regions of those lands, have furnished Prof. Huntington with special qualifications for investigating the effect of physical environment on

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human distribution and modes of life and thought in Palestine, where history reaches back to a far remoter period than in most lands. Eight months of the spring and summer of 1909 were spent in traversing the country in many directions; and since the rainfall was exceptionally deficient in the early months of that year, the struggle for subsistence on the margins of the more arid portions was strongly emphasised.

The first half of the book deals with the form of the different parts of Palestine, and its relation to the geological structure on one hand, and the distribution, occupation, and past history of the inhabitants on the other. It is this physical basis that distinguishes the present volume from many descriptions of the same region. The isolated plateau of Judæa is indicated as the heart of the land from its isolated and uplifted position, in which it stood apart from the great highways of trade which passed to the north and to the south of it, while the moisture from the Mediterranean gave it a moderate fertility. On the west the broken foothills of the plateau form a transition zone, the Shephelah, between the plateau and the coastal plain alternately controlled by the Hebrews of the highland and the Philistines of the sea margin. But on the west, facing the valley of the Jordan on the leeside of the plateau, rainfall rapidly diminishes, and the desert conditions are sharply contrasted with the comparative fertility of the Shephelah but five and twenty miles away. Similarly the present form of Samaria, due to original folding worn down by erosion to a peneplain which has since been elevated and partially dissected, has opened this portion of the land to the peoples of the East, the coast-dwellers, and traders from Africa, so that the great trade routes and the routes of armies passed through it. The peculiar characteristics of Phœnicia, of Bashan, of Galilee, of the Dead Sea depression and the neighbouring deserts, are in like manner brought out and illustrated by the author's own travels through them and the incidents therein noted, presenting a most vivid picture of the land and the influence of its form on the history of its inhabitants.

In the second half of the book Prof. Huntington treats more especially of the climate of Palestine and reviews the present-day conditions, which he contrasts with the more favourable ones which existed, in his opinion, at an earlier date. He has put forward the same hypothesis in relation to central Asia, Greece, and Asia Minor, on previous occasions, giving numerous data in support of a modification of climatic conditions during the past twenty or thirty centuries. The lines of evidence reviewed are (1) the density of the population of Palestine at various periods; (2) the distribution of woodland; (3) ancient migrations, trade routes, and lines of invasion; (4) the distribution, location, and water-supply of abandoned sites; (5) the fluctuations of the Dead Sea.

Under the semi-arid conditions which prevail over the greater part of the country, and the strictly seasonal character of the rainfall, even small departures from the normal amount react powerfully on the economic conditions throughout the area, so that there must always be a strong inclination to postulate definite deterioration of climate where signs of former occupation now abandoned are to be seen. Some of the caravan routes in northern Africa, now but little used, give little sign of their practicability for the great caravans which we know used them a few decades ago, but which altered economic conditions have suppressed. Human settlements cannot always furnish evidence that all in a given spot were occupied at the same time, and the preservation of perishable objects affords some testimony that past rainfall was not of great abundance. The author argues that there have been pulsations in the rainfall, dry periods succeeding others of greater humidity; and that, on the whole, in Palestine a diminution of rainfall from the earliest historical times to the present era has been in progress, while the pulsations within these periods often coincide with great race movements.

The importance of these alternations of dry and humid periods of moderate intensity will be generally admitted, and on the margins of desert regions the effects will be most strongly marked; but while their reality is beyond question, and the evidence for a certain decrease in the average total rainfall from the earlier historic times to the present day is obtainable in certain areas, the direct connection of race movements with such climatic variations at certain periods of history seems to be scarcely established as yet. But in any case, a most valuable summary of the subject as it relates to Palestine is given, and a survey of the history of it and the surrounding lands furnishes occasion for indicating race movements and events which apparently coincide with more or less favourable conditions of climate. An orographical map, as well as a photograph of a model of Palestine, enables the form of the land to be appreciated, and the photographs are most instructive, though the geographer will wish they had been larger. The diagrams in the text suffer from the paper being unsuited to this form of illustration.

H. G. L.

A GUIDE TO ELECTRICAL TESTING.

Testing of Electromagnetic Machinery and other Apparatus. By B. V. Swenson and B. Frankenfield, assisted by J. M. Bryant. Vol. ii., Alternating Currents. Pp. xxvi+324. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1911.) **Price 11s. net.**

"THE efficient direction of any industry to-day demands a very large amount of technical knowledge which cannot be learned at the bench or in the shops."

With this quotation, taken from the writings of Prof. J. B. Johnson, the authors dedicate their work to his memory, and this also gives the keynote to the book. It is essentially a guide to electrical testing, so that the reader may be fitted for that particular technical knowledge which is required in the test-room of a modern electrical engineering works. The reader must, however, not be a beginner; on the

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